

CLAIMS

What is claimed is:

1. A lens comprising:

a substrate;

a first dielectric layer comprising a high index dielectric material uniformly covering an outer surface of said substrate;

a second dielectric layer comprising a first low index dielectric material uniformly covering said first dielectric layer; and

a third dielectric layer comprising a second low index dielectric material gradiently covering only a portion of said second dielectric layer.
2. The lens according to claim 1, wherein said first low index dielectric material and said second low index dielectric material are the same or different materials.
3. The lens according to claim 1, wherein said high index dielectric material is Cr_2O_3 .
4. The lens according to claim 1, wherein said third dielectric layer covers approximately one half of said second dielectric layer.
5. The lens according to claim 1, wherein third dielectric layer covers approximately a top half of said second dielectric layer when said lens is in its normal operating orientation.

6. The lens according to claim 1, wherein said first low index dielectric material comprises a material selected from the group consisting of SiO, SiO₂ and TiO₂.

7. The lens according to claim 1, wherein said second low index dielectric material comprises a material selected from the group consisting of SiO, SiO₂ and TiO₂.

8. The lens according to claim 1, wherein said substrate is a material selected from the group of glass, plastic, CR39, polyamides, polycarbonate, polymethyl methacrylate, polyurethane, cellulosic polymers, and substrates of the same materials but incorporating a polarizing film into the body of the substrate or adherent to its surface.

9. The lens according to claim 1, wherein said lens is a sunglass lens for use in a pair of sunglasses.

10. A lens comprising:
a substrate;
a metal layer comprising a metal material uniformly covering an outer surface of said substrate;
a first dielectric layer comprising a first dielectric material uniformly covering said metal layer; and
a second dielectric layer comprising a second dielectric material gradiently covering only a portion of said first dielectric layer.

11. The lens according to claim 10, wherein said first dielectric material and said second dielectric material are the same material.
12. The lens according to claim 10, wherein said first low index dielectric material and said second low index dielectric material are different materials.
13. The lens according to claim 10, wherein said second dielectric layer covers approximately one half of said first dielectric layer.
14. The lens according to claim 10, wherein second dielectric layer covers approximately a top half of said first dielectric layer when said lens is in its normal operating orientation.
15. The lens according to claim 10, wherein said metal material comprises an element selected from the group consisting of silver, chromium, aluminum, gold, nickel and germanium.
16. The lens according to claim 10, wherein said first dielectric material comprises a material selected from the group consisting of SiO, SiO₂, TiO₂, and Cr₂O₃.
17. The lens according to claim 10, wherein said second dielectric material comprises a material selected from the group consisting of SiO, SiO₂, TiO₂, and Cr₂O₃.
18. The lens according to claim 10, wherein said substrate is a material selected from the group of glass, plastic, CR39, polyamides, polycarbonate, polymethyl

methacrylate, polyurethane, cellulosic polymers, and substrates of the same materials but incorporating a polarizing film into the body of the substrate or adherent to its surface.

19. The lens according to claim 10, wherein said lens is a sunglass lens for use in a pair of sunglasses.

20. A lens comprising:

a substrate;

a first metal layer comprising a first metal material uniformly covering an outer surface of said substrate;

a first dielectric layer comprising a first dielectric material uniformly covering said first metal layer;

a second metal layer comprising a second metal material gradiently covering only a portion of said first dielectric layer; and

a second dielectric layer formed of a second dielectric material gradiently covering said second metal layer.

21. The lens according to claim 20, wherein said first metal material and said second metal material are the same or different materials.

22. The lens according to claim 20, wherein said first dielectric material and said second dielectric material are the same or different materials.

23. The lens according to claim 20, wherein said first and second metal materials comprises an element selected from the group consisting of silver, chromium,

aluminum, gold, nickel and germanium, and wherein said first and second dielectric materials comprises a material selected from the group consisting of SiO, SiO₂, TiO₂, and Cr₂O₃.

24. A lens comprising:

a substrate;

a first dielectric layer comprising a first dielectric material uniformly covering an outer surface of said substrate;

a second dielectric layer comprising a second dielectric material uniformly covering said first metal layer;

a metal layer comprising a metal material gradiently covering only a portion of said second dielectric layer; and

a third dielectric layer formed of a third dielectric material gradiently covering said metal layer.

25. The lens according to claim 24, wherein said first dielectric material is a high index dielectric material and wherein said second and third dielectric materials are high or low index dielectric materials.

26. The lens according to claim 24, wherein said second and third dielectric materials are the same or different materials.

27. The lens according to claim 24, wherein said metal material comprises an element selected from the group consisting of silver, chromium, aluminum, gold, nickel and germanium, and wherein said first, second and third dielectric materials comprise a material selected from the group consisting of SiO, SiO₂, TiO₂, and Cr₂O₃.

28. A lens comprising at least one dielectric layer comprising a high index dielectric material deposited in a uniform thickness and at least one dielectric layer comprising a low index dielectric material deposited in a gradient thickness.

29. A lens adapted to be worn by a wearer, said lens comprising:
a substrate having an inner surface and an outer surface; and
at least one dielectric layer deposited in a gradient thickness either directly or indirectly over said outer surface of said substrate;
wherein said dielectric layer does not cover said entire outer surface of said substrate when observed from the side of the lens opposed to the eyes of the wearer.

30. A lens adapted to be worn by a wearer, said lens comprising:
a substrate having an inner surface and an outer surface; and
at least one metal layer deposited in a gradient thickness either directly or indirectly over said outer surface of said substrate;
wherein said metal layer does not cover said entire outer surface of said substrate when observed from the side of the lens opposed to the eyes of the wearer.

31. A lens adapted to be worn by a wearer, said lens comprising:
a substrate having an inner surface and an outer surface;
at least one metal layer deposited in a gradient thickness either directly or indirectly over said outer surface of said substrate; and
at least one dielectric layer deposited in a gradient thickness either directly or indirectly over said outer surface of said substrate;

wherein neither said metal layer nor said dielectric layer cover said entire outer surface of said substrate when observed from the side of the lens opposed to the eyes of the wearer.

32. A lenses adapted to be worn by a wearer, said lens comprising at least two zones with differently colored reflection when observed from the side of the lens opposed to the eyes of the wearer.

33. A lenses adapted to be worn by a wearer, said lens comprising at least two zones with differently colored reflection, one of which is gradiently reflective, when observed from the side of the lens opposed to the eyes of the wearer

34. A lens comprising at least one dielectric layer applied in a gradient manner.

35. A lens comprising at least one dielectric layer applied in a gradient manner and at least one metal layer applied in a gradient manner.

36. A method of manufacturing a lens having a chromatic effect comprising the steps of:

providing a substrate having an outer surface;

vacuum depositing a first dielectric layer comprising a high index dielectric material at a uniform thickness over said outer surface of said substrate;

vacuum depositing a second dielectric layer comprising a high or low index dielectric material at a uniform thickness over an entire outer surface of said first dielectric layer;

masking a portion of said second dielectric layer; and

vacuum depositing a third dielectric layer comprising a high or low index dielectric material at a gradient thickness over an unmasked portion of said second dielectric layer.

37. A method of manufacturing a lens having a chromatic effect comprising the steps of:

providing a substrate having an outer surface;

vacuum depositing a metal layer at a uniform thickness over said outer surface of said substrate;

vacuum depositing a first dielectric layer at a uniform thickness over an entire outer surface of said metal layer;

masking a portion of an outer surface of said first dielectric layer; and

vacuum depositing a second dielectric layer at a gradient thickness over an unmasked portion of said first dielectric layer.

38. A method of manufacturing a lens having a chromatic effect comprising the steps of:

providing a substrate having an outer surface;

vacuum depositing a first metal layer at a uniform thickness over said outer surface of said substrate;

vacuum depositing a first dielectric layer at a uniform thickness over an entire outer surface of said first metal layer;

masking a portion of an outer surface of said first dielectric layer;

vacuum depositing a second metal layer at a gradient thickness over an unmasked portion of said first dielectric layer; and

vacuum depositing a second dielectric layer at a gradient thickness over an entire outer surface said second metal layer.

39. A method of manufacturing a lens having a chromatic effect comprising the steps of:

providing a substrate having an outer surface;

vacuum depositing a first dielectric layer comprising a high index dielectric material at a uniform thickness over said outer surface of said substrate;

vacuum depositing a second dielectric layer comprising a high or low index dielectric material at a uniform thickness over an entire outer surface of said first dielectric layer;

masking a portion of an outer surface of said second dielectric layer;

vacuum depositing a metal layer at a gradient thickness over an unmasked portion of said second dielectric layer; and

vacuum depositing a third dielectric layer comprising a high or low index dielectric material over an entire outer surface said metal layer.